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BALTIMORE NEW YORK

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ROOTS

Installation of Roots Low Pressure Blower used to furnish air to Water Gas Sets at Plant of Public Service Gas Co., Paterson, N. J.

Save 25% of the Steam by Installing a ROOTS Blower for Your Water Gas Sets

A high quality Turbo Blower requires 400 H. P. to deliver 40,000 cubic feet of air per minute at 42" W. G. The Roots Rotary Positive Blower requires but 300 H. P. to deliver the same volume of air at the same pressure.

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In addition to the great power saving, better operating conditions are noted. It is natural to expect this because the necessary volume of air is forced through the fire regardless of clinkers. At one plant in which a Roots Blower replaced a fan, the superintendent estimated an increase in make of thirty per cent. An increase in make of gas can be expected, especially where an old-style fan is replaced by a Roots Blower.
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Detarring Gases by Electrical Precipitation

The principle of the process and its application to water gas purification

N. H. Gellert

FOR many years the gas industry has detarred gas by the use of water and mechanical impact. Lately interest has turned to the application of electricity to do the same work.

The electrical precipitation process of cleaning gases and recovering values from gases, as invented by Dr. F. G. Cottrell, formerly head of the Bureau of Mines, has been applied to many industries with success. Over more than a decade it has advanced rapidly from an experimental unit to commercial installations of tremendous size. Its application has been wide in place and type. It may now be found recovering sulphuric and phosphoric acids, removing cement dust from flue gases, precipitating the arsenic and metallic fumes from copper smelters, salvaging gold and silver values in reduction works, and cleaning the coke and iron dirt from blast furnace gases. These uses do not by any means cover the range of application of the Cottrell Electrical Precipitation process, but they are characteristic of the breadth of scope possible to this remarkable method of cleaning gases.

Application to Combustible Gases More Difficult

The application to combustible gases was more difficult and was developed more slowly than the application to other processes because the problems involved were much more complex and the type of equipment much more difficult to design. But over a period of five years electrical precipitation has successfully removed the dust from the combustible gases of two blast furnaces in the United States and for a period of about a year at a third blast furnace. Lately it has operated on a somewhat smaller scale for the detarring of water gas.

That the process as applied to combustible gases is not at all experimental may be seen from the fact that as much as sixty thousand cubic feet of gas per minute is being handled through the cleaning plant at one of the blast furnaces mentioned above. There is now being designed for a large western steel works a cleaning plant of the Cottrell type which will handle approximately one hundred and sixty thousand cubic feet of blast furnace gas per minute.

While the application of this process to the detarring of coke oven and other manufactured gas is comparatively new, considerable work has been done to indicate that it has reached a stage where the interest of the gas industry as a whole is warranted.

The Nature of the Process

Briefly the Cottrell process of electrical precipitation, which should not be confused with any other type of electrical detarring of gases, consists in treating the gas in vertical pipes with a unidirectional high tension current, causing precipitation of the tar particles. In the sketch shown may be seen the vertical pipes suspended from a header plate under which the gas to be treated is admitted. The gas circulates around the outside of the tubes and down toward the bottom of the precipitator shell, where it enters the vertical pipes and flows through the pipes to the outlet at the top of the precipitator. In each of the vertical tubes is suspended an electrode consisting of a chain or wire which is held taut by small weights at the bottom.

Sometimes rigid electrodes may be used. By a system of proper insulator bushings the current is brought from the electrical equipment to the framework from which these electrodes are suspended, and is applied at from forty to sixty thousand volts to the gases flowing through the tubes. Since the current is uni-directional, that is, flowing in one direction, the gases which pass up through the tubes

at a velocity of ten feet per second or less, are ionized by the corona discharge from these iron electrodes. By means of this ionization, negative charges of electricity are placed on the small particles of tar and dirt which may exist in the gas, and because the electrodes are negatively charged, the particles are forced to the sides of the pipe, which is grounded through the shell. Immediately on reaching the pipe, the particle of tar begins its flow downward and drops from the bottom of the pipe to the bottom of the precipitator shell. The precipitator is therefore self-cleaning and the operation is continuous. As long as the current is on, precipitation takes place.

Furnishing the High Tension Current

The high tension current in such an installation is furnished by means of a transformer, which rises the plant voltage from 220 volts to the desired forty to sixty thousand volts. A mechanical rectifier operated by the synchronous motor converts the high tension alternating current to current with a uni-directional flow.

Of especial interest to the gas man are the following specific applications of electrical precipitation:

In one of the oil refineries there is a battery of twenty-four asphalt stills in which a heavy tar residue left after the crude oil has been thoroughly distilled is oxidized by a mixture of air and steam blown through the asphalt. The capacity of these stills is approximately twelve hundred barrels of heavy tar and oil during twenty-four hours of operation. Previous to the installation of the Cottrell system, gases from all of these stills passed into a common manifold, and thence to a concrete stack. The suspended particles of tar escaped from the top of this stack and not only created a nuisance that was extremely objectionable to the surrounding neighborhood, but also represented a loss of value that was recoverable.

Results Obtained With the Cottrell Process

When the Cottrell system was installed to handle ten thousand cubic feet of gas per minute at a temperature of approximately 180 degrees Fahrenheit, the nuisance was eliminated and the actual recovery of oil averaged a hundred barrels per day. This oil has since been used as fuel under the stills. Had the efficiency of this equipment proven itself to be low, it would nevertheless have been satisfactory. Even with low efficiency, the recovered values made the operation of interest, but the actual removal of suspended material averaged 98 per cent of the particles which originally existed in the gases.

This installation has proved to be self-cleaning since the tar and oil, even though they were rather thick, ran freely from the precipitator pipes. The tar content alone of the inlet gas averaged approximately thirty-eight grains per cubic foot, while the tar content in the outlet gas amounted to less than one grain per cubic foot. The total power consumption on this installation is not over two kilowatts, a ridiculously small power input for the results obtained.

The Advantages of the Process

In this particular instance the Cottrell system has accomplished what had been characteristic of its application in many other industries. It has not only solved the nuisance problem for this oil refinery, but has made the solution of this problem a paying investment for the refinery. It has often been the case that manufacturing plants have been forced to apply the Cottrell process to eliminate nuisance. Although they have been satisfied to make the necessary expenditure for a cleaning plant to eliminate the nuisance, they have eventually discovered that the recovered values made the investment a profitable one. But the gas man's interest is not so much confined to the elimination of nuisance as it is in efficiency, for at the present time he is already detarring his gas. What he desires is a detarring device that will operate with the least maintenance and operating cost, and give him the smaller amount of residual tar in his gases.

Detarring Producer Gas

At a steel plant in the northwest, a Cottrell cleaner has been in operation for several years on a battery of five gas producers. The gas coming from these producers has been used for the operation of gas engines at such times when the blast furnaces of the company have not been running. Ordinarily there is sufficient blast furnace gas and the producer plant is not in continuous operation, but when the producer plant is running it is necessary to remove every trace of tar if possible before the gas can be successfully taken in by the gas engines. The electrical precipitation plant, therefore, has been used to remove the last traces of tar in the gases after they have passed through wet scrubbers, Ernst washers and centrifugal dryers and blowers. The tar content of the inlet gases has been approximately .0875 grains per cubic foot and the cleaner has removed most of this tar, leaving only .006 grains per cubic foot in the outlet so that the average efficiency is about 95 per cent.

The material precipitated to the sides of the pipe is very liquid, flows rapidly and makes the plant self-cleaning.

Removing Tar from Water Gas

Lately the interest of gas manufacturing plants has been sufficiently aroused to warrant trial installations for the removal of tar from water gas. One such installation has been in operation at a western plant for some time. The equipment replaces shaving scrubbers and handles approximately five thousand cubic feet of gas per minute. No efficiency tests have been made, but filters obtained

(Continued on page 1134)

Compensating the Salesman*

Proper remuneration and its incentive to greater sales effort

Thomas I. Kennedy

Manager New Business Departments, Henry L. Doherty & Company, New York

MARK TWAIN one time remarked, "A great deal has been said about the weather, but nothing has been done about it." The subject assigned me has been discussed for many years, and nearly every method of compensating salesmen has been tried, or is being tried, without a universal agreement by the Gas Fraternity upon a single outstanding plan of compensation that will most expeditiously promote the increased sales of our primary product—**gas.** It is my purpose in this paper to present some principles regarding compensation of sales departments which appear as essential incentives for making the gas business a greater success.

The successful business organizations of today, and those who have maintained their healthful existence, have done so primarily through their successful sales departments. All activities of the business have rested, in final analysis, upon the volume of sales. It is my opinion that some of the shortcomings of the gas companies of today may be due to our shortsightedness in the lack of training and building up real selling organizations. We have accordingly suffered loss of increased gross gas revenue through not selling increased use of gas service, by attaching more appliances to the mains, developing present and new territory, good will and favorable publicity. I can see only partial success has rewarded those who had not the courage and faith to maintain and develop a sales organization to promote and protect their present investments.

Most operators of gas companies will agree that even through large expenditures of money, it is impossible to double the earnings of a gas company; but they will agree that it is possible to double the earnings of a gas company by developing through sales the market for its product.

The Necessity for an Efficient Sales Department

Looking back over the sales investments made, it seems to the writer that the one supremely necessary part of their past programs, that gas companies failed to make constant use of, was a well-paid, efficient and enthusiastic sales department, made up of well-trained house-to-house representatives; men and women who would constantly keep the gas company's name before the public and their customers for improved and increased gas service, keeping alive at the same time the public policy program that we now spend so much time and money upon.

The Day of the Man Who Can Sell

Today is the day of the man who can sell, it matters not whether he is a salesman or an executive; the world will drop into that man's lap his share of profits or commissions accruing from a sale, whether the sale be a gas consuming appliance, the company's policy, or the company itself. Everything now is for sale, the price paid for the same depending upon the sales policy or the salesman.

Successful companies employ and keep salesmen who are keen and alert, and in turn successful men stay with successful companies. Therefore, when a company has a large labor turnover in salesmen, it must bear the stigma that the company pursues an unbusinesslike policy or a very indifferent one. An indifferent policy on the part of the gas company is an expensive one, not necessarily in outlay of cash, but in gas revenue not forthcoming due to business remaining off the company's books for lack of energetic salesmanship.

The Error of Getting the Man Cheap

The usual error of most gas companies has been trying to get a man too cheap. The cheap man is soon replaced by another of the same caliber who lingers no longer. If we employ a cheap man, we can expect nothing but cheap results.

Care should be exercised in selecting our salesmen or representatives, and we should endeavor to attract the highest type of men; men with pleasing personalities and ability, who can properly tell our story to our customers and the public. Our salesmen should be the main point of contact, the go-between or the connecting link between the customer and the company.

We will have to become sold on the idea that it is not going to be inexpensive to train and educate a man so that he can intelligently represent the gas company. I estimate that it costs the gas company at least $1,000 to properly train such a representative, this cost being largely made up of the time that the management must devote to him and the loss of the maximum production of this man during the educational period. Therefore, it behooves us to adequately remunerate our salesmen, so as to protect our investment in them.

Failure of Sales Programs

No doubt many utility executives have attempted to organize and put through some sort of a sales program, but have not found the expected results forthcoming, experienced difficulty in handling

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*Presented at the 1924 Convention of the American Gas Association.

Advertising and Sales Stimulation*

The budget and percentage plans and the importance of advertising in general

Frank LeRoy Blanchard

THE attitude of some gas company presidents and managers toward advertising is shown by the statement made by one of them when I asked him why his company did not advertise. "Why should we spend money for advertising," he said, "when ours is the only gas company located in this city? If people want gas they must come to us to get it."

What this gas company president said was undoubtedly true, but, like many other public utility men, he lost sight of the fact that two of the most important functions of advertising are to create desire and induce action. There is a certain amount of business that comes to a company without the help of advertising. Such customers know the advantages of gas through observation or experience in other cities, or through education. Naturally, they go to the local gas company for its service, just as they would go to a grocery store to buy flour or sugar.

Why It Is Necessary to Advertise

But what of the hundreds, thousands and even millions of people who have not had such experience and, therefore, do not know what gas can do for them if introduced into their homes? How are they to be converted into gas users? It can only be done by bringing to their attention the many ways in which gas can be employed to lighten the burden of housekeepers and give comfort and cheer to the home.

There are two principal ways of reaching non-users of gas—through salesmen and through advertising. A large number of companies in the smaller cities of the country do not employ salesmen on the ground that people who want gas will, of their own accord, come to the company to get it. The additions to the load carried by such companies from year to year are small. It is difficult to understand how the owners of such gas companies can be content to jog along in this way when a rich, fertile field of prospects lies at their very doors awaiting cultivation.

Advertising Not a Panacea of Business Ills

It is when a gas company faces the urgent need of new business to make the enterprise a success, and personal solicitation alone cannot be relied upon to produce it, that advertising is called upon as a last resort, to do the work. Advertising, however, should not be regarded as a panacea for the ills of business, to be employed only in emergency cases. It should be regarded as the most powerful sales force at the command of the company, and, like the engine that makes the wheels of industry go around, should be employed continuously.

Advertising, then, is a sales stimulant, reaching at low cost the majority of the intelligent inhabitants of the community in which it works. Like all other forces, however, you must know how to control and direct it, if you would secure the best results.

Gas companies must advertise to develop the volume of business to which they are entitled by virtue of their position in the community. None of them should be so blind to its own interest as to ignore the aid that its employment will bring.

The Budget Plan

The first is the budget plan, and the second is based on a per cent of gross revenue. Under the former, decision is first made as to what the advertising is expected to accomplish. Is it to increase to a definite quota the number of customers on the gas service lines and the sale of appliances? Is it to promote good will? Is it to tell the public about the many ways in which gas can be economically employed in the home, the factory and the store? Or is it a combination of all three?

Extent of Territory to Cover

Having decided what the advertising is expected to accomplish, the next thing to be considered is the extent of the territory to be covered. In the case of a local company, the city in which it is located is, of course, the field in which the advertising must work. When a company operates plants in different cities, each one is regarded as a unit, its advertising needs being considered individually.

After the advertising manager or the manager of the company has assembled all the data I have indicated, he endeavors to figure how the desired purposes can best be accomplished, and at what cost. He fixes upon the amount and cost of space that will be needed to present in a proper manner the advertising copy he intends to use, the number and cost of the booklets, folders and letters that will be employed in direct mail sales efforts and the quantity and cost of posters, hangers and painted bulletins that will be required. He must make due allowance for research work, for office salaries.

(Continued on page 1142)

*Presented at the 1924 Convention of the American Gas Association in Atlantic City.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 43

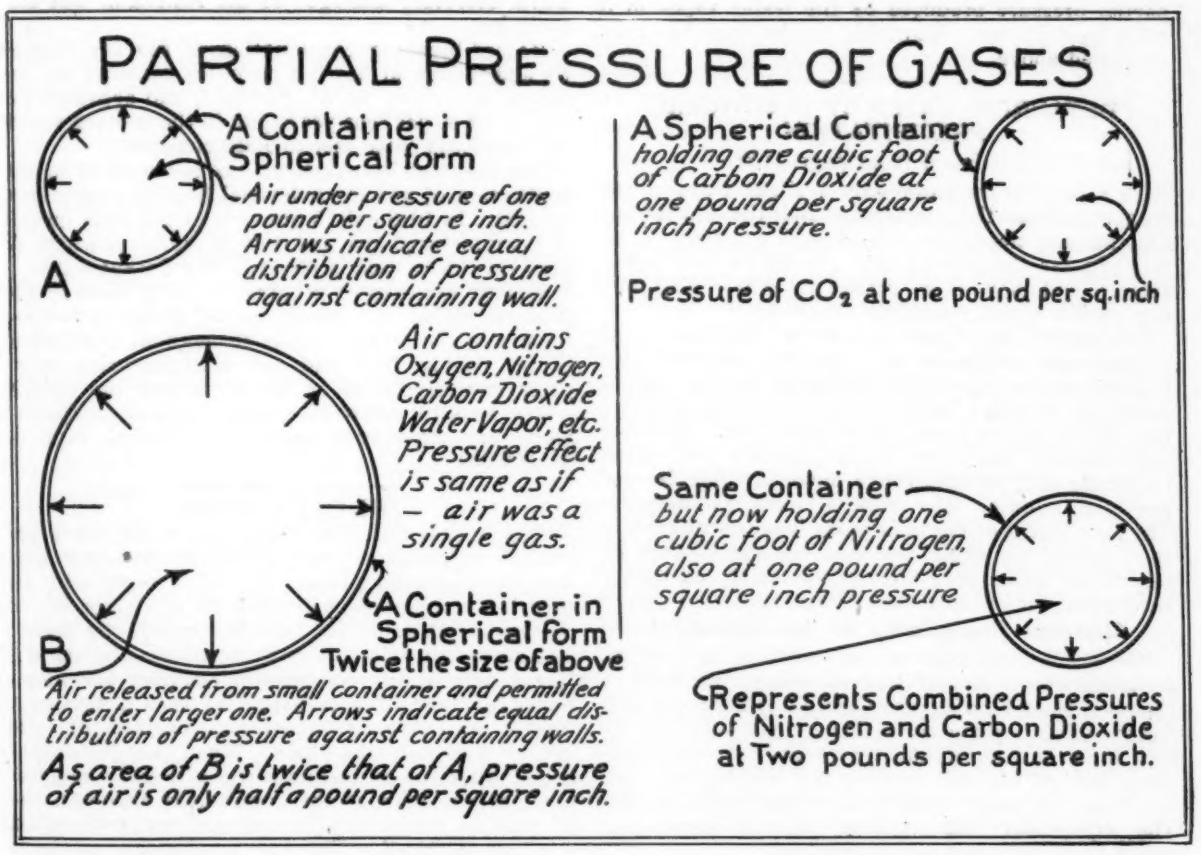
Expansion Effect of Heat (continued)

Partial Pressures

When it is said that the pressure exerted by the atmosphere is fifteen pounds per square inch, it is meant that the entire mixture of gases which constitute the atmosphere exerts that pressure. In other words, the total pressure of fifteen pounds per square inch is the sum of the individual pressures exerted by the constituents of the atmosphere. This is one peculiar feature of gases and it may be explained in other words by saying that no matter how confined the space nor how extensive it may be, when a gas is introduced into it the gas will exert some pressure against the walls which confine the space. This pressure will, of course, be dependent on the size of the space besides other conditions.

The temperature will have a marked effect on the pressure, as we have seen, for the volume of the gas will be increased as the temperature rises, and as this happens the pressure exerted by the gas against the containing walls will increase. The weight of the gas will remain the same, unless the temperature drops to such a point that some of the gas or vapor condenses and is converted into the liquid state.

Let it be supposed that a cubic foot of gas, carbon


PARTIAL PRESSURE OF GASES
A Container in Spherical form
Air under pressure of one pound per square inch. Arrows indicate equal distribution of pressure against containing wall.
A
A Spherical Container
holding one cubic foot of Carbon Dioxide at one pound per square inch pressure.
Pressure of CO_2 at one pound per sq.inch
Air contains Oxygen, Nitrogen, Carbon Dioxide Water Vapor, etc. Pressure effect is same as if — air was a single gas.
A Container in Spherical form
Twice the size of above
B
Air released from small container and permitted to enter larger one. Arrows indicate equal distribution of pressure against containing walls.
As area of B is twice that of A, pressure of air is only half a pound per square inch.
Same Container
but now holding one cubic foot of Nitrogen, also at one pound per square inch pressure
Represents Combined Pressures of Nitrogen and Carbon Dioxide at Two pounds per square inch.

dioxide gas, was introduced into a sphere which had a volume of one cubic foot and that the pressure of the gas against the sides of the sphere was one pound per square inch. Then introduce another cubic foot of a gas, say nitrogen, which also had a pressure of one pound per one cubic inch. What will be the total pressure exerted against the sides of the container by the mixture of the two gases? The law of partial pressures says that the combined pressure will be the sum of the individual pressures, or two pounds per square inch.

There is another point that must be mentioned, and that is the way in which the mixture of gases behaves thermally. If the temperature is raised, what happens? The gases in the mixture expand, and if they are all true gases and do not change their state during the period of temperature change, then the mixture of gases may be considered to act as if it were constituted of any one of the ingredients that compose it.

In coal gas or water gas or mixed gas there is always a certain percentage of water vapor. If it is desired to find the true pressure of the gas, then the partial pressure produced by the water vapor in it must be deducted. How this can be done has been explained above.

DETARRING GASES BY ELECTRICAL PRECIPITATION

(Continued from page 1130)

with a tar camera show only a slight trace of tar escaping from the apparatus, and the indications are that the cleaner is removing 95 per cent of the tar. So far the results have proved entirely satisfactory and there is no reason to believe that this application is not eminently successful.

During the early part of last year the interest of a large gas syndicate was secured and extensive tests were run at one of its plants in the east to determine whether the Cottrell process was suitable for removing tar from their water gas. At their experimental gas plant an installation was made to handle approximately five hundred cubic feet of gas per minute. The results were satisfactory. The tar content of the inlet gases was approximately four grains per cubic foot and the tar content of the outlet gases was 0.18, representing an actual removal of tar of more than 95 per cent.

Electrical Precipitation of Tar Successful

The syndicate considered the results of these tests so satisfactory that it has contracted to have a cleaning plant built of the Cottrell type which will handle thirty million cubic feet of gas per twenty-four hours, or approximately twenty-two thousand cubic feet of gas per minute, and will remove the tar from the gases issuing from their main plant. The equipment will replace shaving scrubbers, which have been used up to this time.

A little over five years ago there was not a single electrical precipitation plant operating on blast furnace gas, either in this country or in the world. Today there are three such plants in the United States, another in the course of design and building, and electrical precipitation is being used for cleaning blast furnace gases in England, France and Germany. This was not accomplished in a minute, but was only the result of determined effort to surmount the difficult problems involved. These problems were far greater in the blast furnace field than they are in the manufacturing gas industry.

It will well repay modern progressive gas men to focus their attention for a moment on the newest applications of industry for the purpose of eventually eliminating an old, time-worn, clumsy method of gas cleaning by water and adopting electricity as a cleaning force.

The writer is much indebted to the Research Corporation of New York City, manufacturers of Cottrell plants for detarring gases, for the data contained in this paper.

MORE GAS USED IN U. S. IN LAST DECADE THAN IN PREVIOUS 40 YEARS

Sales of manufactured gas in the United States in the ten-year period ending with 1923 equaled total sales during the preceding forty years, according to statistics recently compiled by Alexander Forward, secretary-manager of the American Gas Association.

Record-breaking consumption of gas for domestic and industrial heating purposes explains the increase, according to Mr. Forward, and accounts for a jump of 30 per cent per capita in the last ten years, or from 7,335 cubic feet to 9,550 cubic feet.

The greatest development has taken place in the application of gas for industrial heating operations, he said. In 1910 only 5 per cent of the total output of manufactured gas was used in industry, where 22 per cent is now used in about 5,000 different ways.

Equally remarkable progress is being made in the domestic field. We expect to add 400,000 new customers to the service mains throughout the United States during 1924 and our manufacturing companies estimate sales of 750,000 ranges and 425,000 water heaters. Appliance sales by gas companies alone are now running at the annual rate of $45,000,000.

OIL GAS MAKING

The process is for producing gas from heavy animal or vegetable or mineral oil without appreciable depsoition of solid matter. The oil is mixed with air practically simultaneously with its discharge into a combustion chamber and the mixture is partly burned and vaporized. The oil-spraying nozzle and the adjacent part of the combustion chamber are maintained by heat of combustion at such a temperature—i. e., above 600° C.—that deposition of solid matter does not take place. When the gas output is not sufficient to maintain the necessary temperature at the inlet of the combustion chamber, the oil may be completely burned and the combustion products diverted. The hot combustion products may be caused to return and sweep over the fuel and air nozzle to obtain the necessary temperature. The carbon in the heavy residue is consumed as a fuel, but the temperature is not sufficiently high to decompose the methane.—(British Patent No. 217,613.)

As The Journal Views It

STATISTICS

One of the most important subjects that was discussed during the recent Convention in Atlantic City in the meetings of the Accounting Section was statistics.

Statistics to the average man generally mean a great mass of figures which he does not understand, and which he is actually afraid of, in a certain sense, but to the man who takes the trouble to look beneath the surface and investigate to see what these statistical figures stand for, there will be unveiled an entirely new world, so to speak, for these very interesting and formidable looking figures represent affairs, happenings and matters of importance and interest that are intimately connected with the gas business.

There is no question but that statistics and their analysis is of the utmost importance to any industry, and particularly to the gas industry, which is demanding more and more information, and, mind you, information of an exact scientific nature. This cannot be given except through the regular compilation of statistical data.

It is, therefore, important to emphasize this matter and call the attention of the gas men to the fact that statistics will furnish them with valuable information regarding their industry. A great mass of statistical matter is gathered by the gas companies, and it is really questionable as to whether or not those who are in control of the companies are aware of the importance of this information and of its potential value.

The accounting man does well to point out that the mere compilation of figures is in itself of very little value. A great mass of numbers will mean very little to the average man. They must be carefully analyzed and collected in a manner that reflects with great accuracy the operations that take place in the business before they be of any real value. This is perhaps one of the most important details that must be watched in the compilation of statistics. In obtaining gas data on plant operations, on merchandise sales, etc., it is necessary that the figures represent accurately what actually takes place. It is not always easy to compile statistical data that will possess this characteristic, but it can be done, and it must be done, if the statistics are to be of real significance.

The work of the statistician in the gas company is, therefore, of marked importance. His duty is essentially to analyze statistical information that is supplied him, interpreting it and relating it to any problem that may be under consideration. He must be able to visualize the operations which these figures represent. They are not to be regarded as mere cold numbers, for they actually contain information of vital importance and are warm with accomplishment. But unless they are translated by a competent statistician into terms that are readily understood, they will remain nothing but a mass of figures.

The accountant, therefore, has an important task before him in the compilation and interpretation of statistics. He can make his value felt in the organization by organizing this work so that it has a live interest for all. He can convert these formidable masses of unintelligible data into an understandable valuable information which shows what has taken place, so that steps may be taken to remedy faults or improve conditions, and to secure better results than are now being obtained.

Statistics cannot become popular and receive the attention that they deserve unless this is done. It is really up to the men who compilate this matter to point out its value. In doing so they will not only be performing a service to the industry, but will also be demonstrating to it the important position which they have to fill in it.

GAS WRINKLES

Locating a Water Leak on a Multitubular Condenser

Probably the most annoying mishap that can occur to a multitubular condenser is for a leak to develop in the tubes or plates which separate the gas and the water divisions. We have had this experience with an apparatus of the style in which the water surrounds the tubes and the gas passes through them. The cut shows the condenser (the water occupying six double compartments, separated at bottom), and indicates the courses which the fluids follow. The leak, of course, first manifested itself by the weakened ammoniacal product, and soon became so considerable as to necessitate the waste of all the condenser liquor. The bolted plates covering the compartments are so placed that it is necessary to raise two of them to reach any one double water compartment, and this involves the removal of 158 bolts. The leak might have been in a division plate at either end, in a top or bottom tube-sheet, or in the tubes themselves in any one of the compartments. It was desirable to locate and stop it with the least possible loss of time, which also meant, of course, the least cost and loss.

At this point a very simple method was employed. A line of pipe leading to a drain runs along the side of the apparatus, with a valved connection to the bottom of each water compartment, for drawing off deposited mud. This attachment was made to assist in the following manner: All mud was first drawn off, then all valves were closed, including that on the main line to the drain. Water was turned on to fill the compartment to the normal height, and then shut off. Then a piece of pipe of a length equal to the vertical height of the water divisions was attached by a street ell to a cross on the mud pipe, and held by a rope so that it could be swung on the L as a center from a vertical to a horizontal position. After standing over night, the water in the leaky compartment had all escaped down to the level of the break. The swinging pipe was then used as a gauge, the valves on the several water divisions being opened one at a time, showing all compartments full but one and thus infallibly indicating the leaky section, as well as the height at which the leak existed.

The same principle has been used in filling a station meter, to show the quantity of water contained until it reached the height of the glass gauge.

PLATE III

LOCATING A WATER LEAK
ON A
MULTI-TUBULAR CONDENSER.

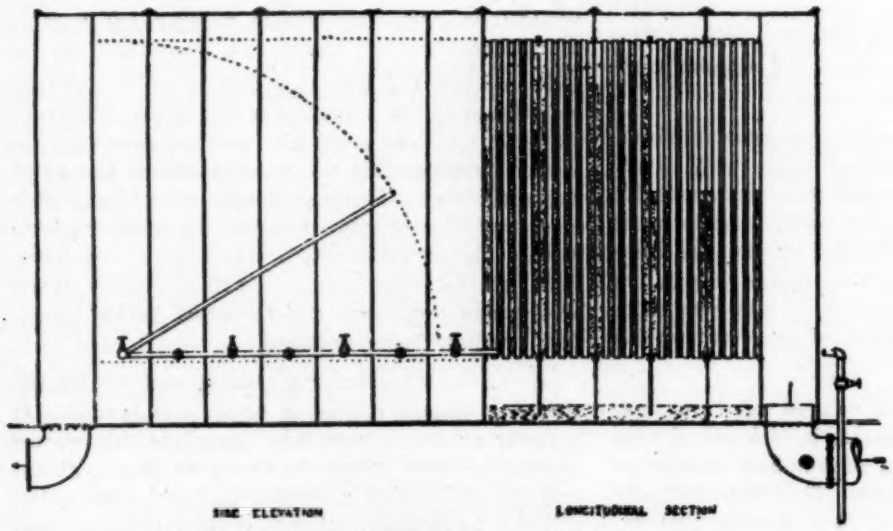


FIG XII

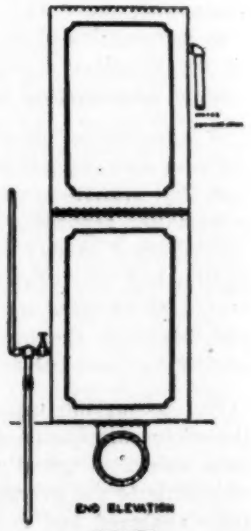


FIG. XIII.

Catechism of Central Station Gas Engineering in the United States

Installment No. 43.

(Continued from last week)

The latter is preferable, unless the conditions are very much against its use, since making lead joints involves the carrying to every repair job of a furnace, lead pot and ladle. Drawings of two styles of split sleeves, showing their dimensions and the number of bolts used, can be found in the Proceedings of the American Gas Light Association, Vol. XV, page 88, and on page xiv of the appendix, and also in the American Gas Light Journal, Vol. LXIX, page 712, and Progressive Age, Vol. XVI, page 529.

When the break runs too far along the pipe to be properly covered by a split sleeve, it is necessary to cut out the damaged portion of the pipe, making the cuts at least three or four inches beyond the furthest point reached by the crack at each end, and replace it by a new piece. To do this the main must be uncovered for a sufficient distance to enable bag holes of the proper size to be drilled and tapped far enough apart not to interfere with the work of putting in the new piece. The gas having been shut off, by means of the bags inserted in these holes, the pipe is cut at the proper points, either with a pipe cutter or by the use of diamond points and cold chisels, and a new piece of pipe of the required length cut and put in, a solid sleeve being used to make the joint where the two spigot ends come together. Before sliding the sleeve into place, the opening between the two spigot ends is covered by wrapping the pipe with unbleached muslin prepared and used as is done in connection with the repair by means of a split sleeve. Either lead or cement joints can be made in the bell and in the sleeve, but the use of cement is generally preferable for the reasons stated above.

Designating Unaccounted for Gas

229. The amount of gas unaccounted for during distribution is expressed sometimes as a percentage of the quantity made and sometimes in terms of the number of thousand cubic feet unaccounted for per mile of main per year. Which method of expression furnishes the best indication of the condition of the distributing system and the best basis for comparison between different companies and different periods in the history of the same company?

Ans. The method of expressing the amount of gas unaccounted for in terms of the number of thousand cubic feet unaccounted for per mile of main per year furnishes a better indication of the condition of the distributing system and a better basis for comparison between different companies and between different periods in the history of the same company than does the expression of this amount as a percentage of the total amount of gas made. The amount of gas sold per mile of main varies so much with different companies that the relation borne by the amount of gas unaccounted for to the total amount made, may be smaller in the case of a company with a compact district than it is in the case of a company with a sparsely settled territory, even though the distribution system of the latter company is in better condition, as shown by the loss of gas per mile of main, than that of the former. Take, for instance, two companies each selling 50,000,000 cubic feet of gas per year, and showing unaccounted-for gas amounting to 5,000,000 cubic feet; one of which has twenty miles of mains and the other sixty miles, the number of meters in use being approximately the same for the two companies. On a percentage basis the two would show the same figures, 10 per cent, for unaccounted-for gas, but, as a matter of fact, the company that shows a loss of 5,000,000 cubic feet on twenty miles of main, or 250,000 cubic feet per mile of main per year, is not doing as well as the one that only shows a loss of 5,000,000 cubic feet on sixty miles of main, or 83,333 cubic feet per mile per year. The unaccounted-for gas is not made up entirely of gas lost by actual leakage from the mains, being partly due to differences in temperature between the station meter and the consumers' meters and also to inaccuracies of registration on the part of consumers' meters, but the amount due to these causes would be practically the same in each case, provided the same attention was paid to the testing and repair of the consumers' meters and the maintenance of a proper temperature at the station meter, and the amounts lost by actual leakage would bear to each other very nearly the same proportion as the total amount of the unaccounted-for gas. Therefore, in the instance assumed, the distributing system of the company with sixty miles of mains is really in much better condition than that of the company with twenty miles, although the percentages of gas unaccounted for are the same. To make the comparison perfectly accurate, the lengths of the different sizes of mains should be reduced to the equivalent length of, say, 3 in. main before the division is made.

The Value of the Percentage System

For comparisons between different periods in the history of the same company, the percentage system is only correct as long as the sales of gas per mile of main remain about the same. When the sales change decidedly, a decrease in the percentage may coincide with an increase in the amount of actual loss. If, for instance, the company with sixty miles of main increased its sales to 100,000,000 cubic feet per year

while its main mileage was increased to sixty-five miles, a loss of 8 per cent would amount to 8,000,000 cubic feet per year, equal to 118,000 cubic feet per mile of main, as against a loss of only 83,000 cubic feet when the percentage was 10.

There are, of course, cases where conditions are so different that even the loss per mile of main per year does not afford a basis for accurate comparisons, but, as a general rule, the conditions which affect the accuracy of such a comparison do not vary as much as do those which affect that of the comparison on the percentage basis.

Electrolysis and Causes

230. What is meant by electrolysis as applied to gas mains and what is its chief cause?

Ans. When applied to gas mains electrolysis is used to denote the corrosion caused by the action of electric currents at the points where these currents leave the gas mains, along which they have previously been traveling, to pass through damp earth to some other conductor that offers a path with a smaller resistance. The process by which the corrosion takes place is exactly similar to what would happen if, in the often-shown experiment of decomposing water by means of electricity, iron plates were substituted for the platinum plates that are used as the poles or electrodes. If this were done the oxygen that gathers around the positive electrode, or anode, would, in combination with the acid in the water, attack the iron and cause it to rust away. This is exactly what happens to the iron of a gas main when an electric current passes from it into damp earth on its way to another conductor. Such earth almost always contains so-called salts, that is, substances formed by the combination of an acid and a base, which are soluble in water, and the current really travels through a solution of these salts. Such a solution is decomposed by the electricity into its acid and basic components, and the acid gathering around the positive electrode, which is the pipe at the place where the current leaves it, attacks the metal, the particles of which are carried with the current through the solution towards the negative electrode. The extent of the corrosion and the rapidity with which it takes place depend upon the amount of moisture in the earth and the quantity of current leaving the pipe. In very dry earth the action is very slow, but in earth that is quite moist it may, when sufficient current passes, proceed very rapidly.

Sources of Electric Current

The chief source of the electric currents which travel along the gas mains and leaving them set up electrolytic corrosion at the points of departure, are the return currents of single trolley wire electric railways. These return currents are supposed to travel back through the rails to points near the power house, from which they reach the negative side of the dynamos by means of return conductors bonded to the rails. As a matter of fact, a greater or less quantity of current, the amount depending on the character of the bonding between the separate lengths of rail and the extent to which insulated return conductors are used, leaks into the ground and finds its way to the gas and water pipes, which offer a path of small resistance as long as they run toward the power house. When the vicinity of the power house is reached, or when the pipes turn to go in a direction that takes them farther away from the power house, they no longer offer the path of least resistance, and the current leaves them to go back to the rails or to some other pipe that continues in the proper direction. As stated above, it is at the points where the current thus leaves the pipe that the electrolytic action occurs. The current may also leave the pipe at points where its conductivity is destroyed or reduced by a joint, even if it again returns to the pipe a little farther along, and electrolysis will also take place at such points.

Electrolysis Not Altogether Preventable

Electrolysis of gas mains cannot be completely prevented as long as the rails are used as return conductors, but the extent to which it occurs can be reduced by careful bonding of the rails, by the provision of insulated return conductors connected to the rails at intervals, and by reducing the conductivity of the gas mains to as low a point as possible so as to make them unattractive as paths for the stray currents.

A committee of the American Gas Light Association made, in 1905, a very complete report upon the causes of electrolysis and the best means of preventing it. This report can be found in the Proceedings of the American Gas Institute, Vol. I, page 761, or in the American Gas Light Journal, Vol. LXXXVI, page 97.

Size of Pipe for Dwelling House Services

231. What is the minimum size of pipe which it is considered advisable to use for services for ordinary dwelling houses? Give the reasons for your answer.

Ans. It is not considered good practice to use any pipe smaller than 1 in. for services for ordinary dwelling houses which are within 40 feet of the street main, nor pipe smaller than 1¼ in. when the house is more than 40 feet from the main, and some engineers never use any pipe smaller than 1¼ in. even for shorter services.

The extra cost of the larger pipe is not a large percentage of the total cost of the service, while the use of such pipe provides for a possible increase in the amount of gas required, a provision which is especially necessary at the present time in view of the great development now going on in the sales of gas for fuel purposes. The use of the larger size of

pipe also prevents trouble from any slight settlement of the service or from partial stoppage due to any other causes. A small amount of water, naphthalene or other deposit that would hardly be noticed in a 1¼ in. pipe would seriously affect the flow of gas though a ¾ in. pipe, and the extra first cost of the larger pipe is thus often offset by the saving effected by having fewer stopped services to deal with. The extra thickness of the larger pipe also gives it a longer life, especially if the pipe used for services is not coated before being laid. The longer life reduces the cost of service repairs. As will be seen by reference to the pipe cards, the difference in thickness between ¾ in. and 1¼ in. pipe is 24 per cent of the thickness of the smaller pipe.

The use of the larger pipe thus provides against the necessity for enlarging the service when a gas range or water heater is installed, and also reduces the cost of maintenance and renewals.

Coating Wrought Iron Pipe

232. Describe some method of coating wrought iron pipe, such as is used for services, or some other way by which this pipe can be protected from corrosion.

Ans. The method of coating service pipes that seems to have given the best results is that which was first employed in Cincinnati after a series of tests made with a number of different coatings. The specifications for this coating are given, and the manner in which it should be applied to the pipes to give the best results is described, in a "Short Topic" prepared by Mr. A. C. Humphreys for the 1895 meeting of the American Gas Light Association, and published in Vol. XIII of the Proceedings, page 186.

The specifications are as follows: "Bring a kettle of tar (20 gallons) to a low boiling point and add 20 pounds of fresh slaked lime, sifted over the top and worked down. Boil down to a paste or a consistency about midway between tar and pitch. Let it settle for a few minutes, then add 4 pounds of tallow and 1 pound of powdered rosin; stir until they are thoroughly dissolved and incorporated with the tar, then let it cool and settle. Ladle off into barrels. When ready for use, to each barrel of 45 gallons of the above mixture add 4 pounds of crude rubber, dissolved in turpentine to the consistency of thick cream. Heat the mixture to about 100 deg. Fahrenheit, and immerse the service pipe, heated to about the same temperature."

Methods of Applying the Mixtures

Different methods have been adopted for applying this mixture, the pipes being dipped in some cases and painted in others. Mr. Humphreys said that the best method was to dip the lengths of pipe into the preparation. In this method the mixture is put into a V shaped trough which is long enough to take the longest length of pipe that is apt to be handled. Along the bottom of this trough is run a steam pipe to heat the mixture to the proper temperature. The pieces of pipe to be coated must also be heated, which can be done either by connecting the pieces to a steam pipe and turning steam on them to give them a test for soundness while they are being heated, or by putting them in a long square box with a hinged cover, the interior of the box being kept hot by means of a steam coil run along the bottom. When the pipes are heated to the proper temperature, they are plugged at both ends to prevent any of the coating from getting on the inside, and are dropped into the hot mixture in the trough. After a few minutes they are taken out, placed on a rack over the trough until the excess of the mixture has dropped off, and then transferred to a drying rack in which they are left until the coating has become thoroughly dry and hard. Care must be taken to keep the pieces from touching each other before they are dry, since, if this is not done, they will stick together, and when pulled apart the coating will stick to one pipe and a bare place will be left on the other. Care must also be taken not to get either the mixture or the pipe too hot, since overheating will drive off the more volatile portions of the preparation, and when the coating cools, it will be brittle and liable to chip off. If the proper precautions are taken and fresh portions of the mixture added from time to time to that already in the trough, the coating will be elastic and will cling very tightly to the pipe. The service gang should, however, be supplied with a pot of the preparation, so that after the service is laid, the spots where the coating has been scraped off by the tools can be recoated before filling in the ditch. In some cases the pipe, as it lies in the ditch, is covered for its whole length with an extra layer of the coating, which forms a roof over it.

Dissolving the Rubber

It will be found rather difficult to dissolve the rubber, but this part of the specifications must not be slighted. Given proper care in the preparation and application of this coating, the pipe covered with it will last much longer than uncoated pipe, and the cost of coating will be more than repaid by the extra life of the services and the lower leakage account.

Connecting Services to Street Mains

233. Give a description, illustrated with sketches, of two or more methods of connecting services to street mains, and state what you consider to be the respective advantages and disadvantages of each method.

Ans. Figure 1 shows the swing joint connectionn and is the method now most widely used. The joint between the street tee and the street ell gives the connction its name and enables th direction of the service pipe to be changed at will during laying, without throwing any strain on the main. This flexibility is especially valuable in congested city streets, where a service has at times but a contracted passage, over some obstructions and under others; or

where, for any reason, two parts of a service are joined by a long screw. Not only does the swing joint enable the laying of a service without any strain being left on the main, but also, should pressure be brought to bear on the service at any future time, the joint would be of use in either wholly or in great part taking up the strain.

Blocking the Pipe

There are a few engineers who believe that where, as in most large cities, a service seldom rests on undisturbd earth, it is safer to block the pipe at each socket, on both sides of the cock and also close to the main. Of course, this blocking at the main prevents the swing joint from being of use to take up strains coming on the service after it is laid, but the advocates of the blocking believe that a blocked service cannot be pressed down to such an extent as to bring a severe strain on the main, and they desire the blocking under the service at the main, in order to prevent any strain that may come in the direction of the length of the main, due to the fact that the line of the service is offset from the tap hole by the distance from center of tee to center of ell.

Use of Tee Instead of Ell

The use of the tee instead of an ell enables the flow of gas to be stopped while the service is being laid (a tapered rubber plug being made for this purpose), and in case of any stoppage in a service requiring digging at the main, the access to the service through the top of the tee may obviate any necessity for cutting the service.

Describing Figures

The only objection that can be advanced against this form of connenction is the greatr liability to stoppages as compared with the stiff topconnnction shown in Figure 2 and the straight side connetcion shown in Figure 3, Figur 1 having one more bend thnn Figure 2, and two more than Figure 3. This objection has no force when applies to the large services of the present day and the well purified gas now being sent out, as the cause of the stoppages found in service bends is almost invariaby rust and sulphur compounds which stop the comparatively small bore of a ⅛ in. or ¾ in. ie. Even naphthalene need not be considered, for it never appears in this country at the junction of main and service.

Figure 2 shows the rigid form of top connection and many thousands of services have been laid in this manner. As has just been said in talking of the swing joint connection, the advantages of simplicity possessed by Figure 2 over Figure 1 are outweighed by the disadvantage of the rigidity of connection, a rigidity which has been the cause of many breaks in 2 in., 3 in. and 4 in. mains.

Figure 3, the straight connection into the side of the main, is the oldest of all forms of connection and was formerly used to a large extent. It allows a wire to be passed hrough he service ino the main itself, quite an advantage when service stoppages were frequent. At present, this advantage of a straight line from house to main is of small importance, while aside from the rigid connection to the main possessed by Figure 3 in common with Figure 2, the growing congestion of city streets makes

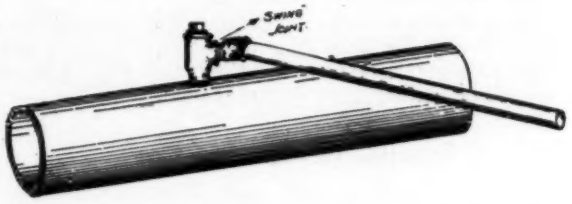


FIG. 1.

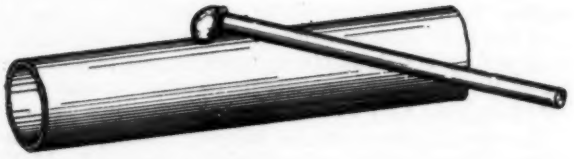


FIG. 2.

FIG. 3.

a side tapped hole more and more an impossibility, because of lack of room to work either a tapping machine or a chisel in a horizontal position.

(Forty-fourth Installment Next Week)

Gas Water Heating Possibilities

A few suggestions of value in this important field for gas

J. E. Bullard

IT can be said without qualification that every gas consumer is a hot water prospect. Every residence, store, office, factory, every place where gas is used has hot water requirements of some sort and these requirements are constantly increasing. It is merely a case of adapting gas heat to these requirements and finding new ways in which to use hot water still further to increase these requirements.

Take the residence, for example. It is equipped with at least one bath room. It is more desirable to keep this room warm at all times than it is any other room in the house. It is a small room and requires little heat, but if the fire in the house heating plant is allowed to get low at night the bath room will be cold in the morning.

Heating the Bath Room

Suppose that a small pipe radiator is constructed out of brass pipe and connected to the hot water line, or suppose that a bare hot water tank is installed in the bath room and connected to the hot water storage tank heater in the basement through a circulating system. Then the bath room will always be warm. If desired, the water may be heated from the furnace in the winter time, the gas heater being used to maintain the proper temperature. In the spring and the fall the water needed for heating the bath room will be heated by gas.

This is a hot water demand that offers considerable opportunity for development. It means better hot water service to the bath room and it means a bath room that is always warm, fall, winter and spring, night and day. The comfort that results will be worth far more than the comparatively small amount of gas consumed. Incidentally it is also a step in the direction of heating the whole house with gas. It will cost so little to heat the bath room and the advantages of this form of heat will be so great that the desire to heat more rooms of the house in the same way is bound to grow.

The Hot Water Requirements of the Meat Market

The meat market has a small office and it has hot water requirements. In the past it has probably been customary to set up a base burner in the office to keep it warm in case the store is not in a building that boasts of a central heating plant. The idea suggested for the bath room in the residence will also serve very nicely for the butcher's office. Perhaps merely installing a storage heater with a small insulated tank to take care of the summer demands for hot water and connecting this to a larger bare tank supported by brackets on the wall where it will be out of the way, the whole installation being made right in the office, will answer the purpose. Making the hot water heater serve a double purpose like this makes it just so much easier to sell the right kind of installation.

Hot Water in Office Buildings

It is becoming more and more the practice of office buildings to buy the electric power they need from the central station. The difficulty of securing the necessary fuel supply, the large space that must be set aside for the fuel, and the value of the space occupied by the electric generating plant all have their influence in making this the case. In the summer time, perhaps the only heat required is that needed to heat the water.

The regular heating plant takes the form of a bank of large boilers. No one of these boilers can be operated efficiently for water heating purposes. This either means a low rate of efficiency for summer water heating or special water heating equipment. In any case some labor must be employed to look after the fires used for heating the water. In many cases, the supply of hot water in the summer time is not satisfactory even then. This is causing more and more installations of automatically gas-fired heaters connected to tanks of the proper size to supply the hot water requirements of the building. These heaters are operated during the summer only and prove much more satisfactory than either coal-fired or oil-fired heaters.

Incidentally there is every prospect that a large enough load of this nature can be built up in most cities to offset the residence heating load that will be taken on. This means a higher load factor on the plant and removes one of the most serious objections to residence heating by gas, that is, the plant capacity that must be provided for this heating and which cannot be used in the summer time.

Hot Water in Industrial Plants

In much the same manner many industries require small quantities of hot water for manufacturing purposes. This water is economically and satisfactorily supplied from the central heating plant during the heating season, but when the summer season comes it is an entirely different matter. Here again is an opportunity to sell gas for summer water heating.

Where large quantities of water are required for short periods, say, at noon and at night when the employes are washing up preparatory to leaving, it is not always an easy matter to supply this water with a coal-fired heater. This requires either a very

(Continued on page 1144)

ADVERTISING AND SALES STIMULATION

(Continued from page 1132)

traveling expenses, art work and other incidental expenses. These various estimates when duly compiled and entered upon a single sheet comprise his advertising budget, the total amount of the items representing the appropriation that will be needed the coming year.

The Percentage Method

The second plan for determining the advertising appropriation is known as the percentage method. Under this plan a certain per cent of the gross income for the previous year is set aside for advertising. Although in the retail business from 2 to 4 per cent, and in the manufacturing and wholesaling of commodities from 6 to 15 per cent, and in a few instances where the margin of profit is large, over 20 per cent, is invested in advertising, yet in the gas industry we are spending only a fraction of 1 per cent. But whatever the per cent of gross earnings set aside for the purpose, all advertising expenditures must be confined to that amount, and the advertising manager must arrange his advertising plans accordingly.

Budget Plan Regarded as Best

I must admit that I regard the first of these plans I have outlined—the budget method—as the best. Some years it is necessary to spend more money for advertising than in others. Perhaps the company has had to combat a movement to establish municipal ownership, or to carry on a campaign to defeat hostile legislation, or to show its public why an advance in the service rate is necessary. In such campaigns the appropriation for the entire year is used up in a few months. If the appropriation is rigidly fixed on a per cent basis, when such contingencies for extra advertising arise, the advertising manager is seriously handicapped. If he is obliged to await the action of the board of directors upon his application for an extra appropriation covering these special campaigns, he might lose the opportunity for striking while the iron is hot, because a majority of the board could not attend the meeting at which it was to be passed upon.

Under the budget plan, a complete outline and an estimate of the cost of the year's advertising are submitted. If the amount of money called for is greater than the directors think can be devoted to the purpose, it can be reduced. If not large enough, and I am glad to say there are directors who appreciate the value of advertising and believe in its liberal employment, a board of directors has actually been known to increase the appropriation voluntarily.

The Newspapers

Newspapers have been found the most productive of all advertising mediums for public utility advertising. People can be counted upon to see your business messages as they appear, because the better class of people in every community are constant readers of the daily and weekly newspapers. Through them you can get quick action upon any proposition you may present. The great problem of all advertisers is to get people to read their advertising.

Direct Mail Advertising

The second best medium is what is known as direct mail advertising—letters, booklets, folders, broadsides, etc. The third is outdoor advertising—posters, painted bulletins and electric and other signs.

The Copy

It is self-evident that the right kind of copy to use is the kind that brings the largest response. Your advertising must be attractive and interesting. In selling gas service appliances we must appeal to the people's love of comfort, their pride and their desire to reduce household drudgery to the lowest point. High-brow copy should be avoided. Your advertising matter should be simple, direct, forceful and inspire confidence. Remember that the average citizen is not a college educated man, although possessing intelligence and common sense. Avoid the use of words not employed in daily conversation or that are not familiar to the average reader. Tell your community about your company—what improvements in plants or service are being made and what they cost; show how it is contributing to the growth and prosperity of the city; introduce some of the men and women with whom customers come in contact and describe their duties; and express your readiness to listen to complaints and give the desired relief.

In describing appliances avoid technicalities. You can tell about their construction and advantages in a manner that will interest and instruct both men and women. The latter don't care so much about the construction of an appliance as they do about what it will do and how it will contribute to their comfort and save work.

Continuous Advertising Necessary

When should gas companies advertise? The answer is "continually." By that I do not mean that your advertisement in the newspaper should appear every day in the week. Two or three times a week is sufficient. If you advertise that often, your public will think you advertise every day. Monday, Wednesday and Friday, or Saturday, are regarded as the best days for the advertisements to appear. You may prefer other days. I do not favor Sunday issues, because of the large number of pages they contain and the enormous amount of advertising they usually carry.

COMPENSATING THE SALESMAN

(Continued from page 1131)

salesmen or found the large turnover discouraging. When properly analyzed, it may be found that one big reason for these difficulties was the niggardly policy in commission set-up whereby the earnings of the salesmen were arranged to compare with those of the office or clerical force. The better the salesman, the greater his monetary return is bound to be, and if he makes an exceptionally good record, he is bound to make more earnings than perhaps some of the sub-executives of the company.

Fundamental Purpose of Sales Department

Many companies make the mistake, I believe, in attempting to lay down the policy that the new business or sales department should operate at a merchandise profit or at least be self supporting after paying all the sales promotion expenses. The fundamental purpose of the sales or new business department is to increase the gross gas revenue of the company. It is not practical to operate a sales department, in our industry, like a department store because our objective and point of view are not the same. They are working merely for merchandise profit, while we are struggling to increase revenue as expeditiously as possible. Through a proper compensation plan for salesmen and aggressive policies, revenues can be increased more in one to two years than can be accomplished in four or five years by the usual methods employed.

Sell Gas

Remember the object of a sales or new business department is to sell **gas,** thereby increasing the gross revenue, and promote the public good will. The results of the activities of the sales department cannot be correctly measured by the number of ranges, water heaters, etc., the department has sold. The activities of a sales department should embrace much more than the one important item of appliance sales if the maximum of increased revenues are to be produced.

Lines Along Which to Work

The following major lines of endeavor should be followed by the sales department if the gas company is to get full value of that organization:

1. To promote the sale of new and additional appliances.
2. Secure new customers from
   (a) Dead gas services, i. e., gas services on premises not in use.
   (b) Houses on gas mains having no gas service.
   (c) Securing the maximum number of customers on gas main extensions.
3. The retention and increasing the gas revenues of present customers through
   (a) Placing all appliances on customers' premises in good order.
   (b) By taking up and following to successful completion customer's complaints on faulty service, appliances, high bills, etc.
4. The analyzing of the minimum bill customers for reasons for not using and correcting cause if possible.
5. To carry to the customer the company policies, correct misunderstandings, and earn the good will and favorable publicity on the part of every customer and the public toward the company.
6. To sell coke and securities and all other products the company has to sell.

Promotion of Sales

It appears to me that the gas industry has spent too little money in promoting its sales or new business departments, due to the fact that no other unit of measurement of the results of these departments is in common use except as applied against the profits from selling merchandise. In the accounting systems used, sales or new business departments are oftentimes charged with expenses incurred for public policy or some other reason beyond their control, which expenses they are expected to cover through merchandise profit. The attitude is sometimes taken that if the sales department shows a deficit it is not a success or it is poorly managed. The true measure of the money spent in the sales or new business department is the increased gross gas revenue produced and the improvement in public relations.

Paying the Salesman for Work Done

Again referring to the compensation of salesmen, were we to pay a merchandise commission only, we could expect that he (the salesman) would devote his entire efforts only to the sale of merchandise and would not bother himself at all about any other operations of the gas company by which he was employed. In the sales activities of a utility, if the salesman is to be responsible for present and future growth of gas revenues and perform the other necessary duties which I have given above, it will be necessary that he be paid, and well paid for this work in addition to his merchandise sales.

A System of Compensation

Recognizing the principles that I have endeavored to explain, in that, the fundamental purpose of the sales or new business department is to increase gross operating revenue of a utility and promote public relations; and realizing the faults of the merchandise and point systems of compensation, the New Business Department of the Doherty Organization, with which I am connected, evolved a system of compensation for increased revenue and improving public relations, which we put into effect

about two years ago. We have endeavored to place the responsibility for the maintenance and promotion of the company's gross gas revenues and good will upon the representative in charge of a territory of 1,000 to 1,500 customers.

Our gas company representative works on a drawing account or a minimum guarantee, and in addition to a merchandise commission he receives a commission on the increased gross gas revenue from his small territory, also some liberal commissions for new customers secured from dead gas services and new houses on mains without gas service and a commission for the sale of a new gas service.

In making up a compensation plan for our gas company representatives, consideration was given to the fact, in the schedule outlined, that our salesmen are now expected to perform duties for which no specific remuneration is attached.

By introducing the feature of having the salesmen participate in the company's increased gas revenues, we are providing an additional incentive for him to work along the lines that he has heretofore not been interested in and neglected.

Results

As the result of this incentive for gas revenue production and coupled with the co-operation of the operating and accounting departments, the increased gas revenues of our companies have been given great impetus. Although the Doherty New Business departments have been operating for over twenty years in merchandising gas appliances, the possibilities of this plan as an incentive for increased merchandise sales was proven in that we enjoyed an increase of some 120 per cent in gas merchandise sales for the year 1923 over the year 1922. In spite of the industrial depression experienced this year, our gas merchandise sales so far this year are about 30 per cent over the same period of the year 1923. The gas merchandise sales per customer of all Doherty gas companies will average this year about $12.00. However, we are measuring the results of our New Business operations in terms of the increase in gross gas revenues and improved public relations, as that is the true measure of their success.

Conclusion

To conclude, the one supremely difficult thing in business is salesmanship. Goods can be manufactured on a formula; but it takes a man to sell. He who sells is a success, others maybe. The man with a secret process of manufacture always imparts his secret sooner or later; but the salesman does not impart his secret, because he cannot. It is not transferable; it is a matter of personality.

If gas companies have salesmen who represent the company in all its branches; who teach the patrons the things you want them to know, who sell the customers appliances; who follow through to successful completion complaints on service, appliances, high bills, etc., and is the company as far as the customers know; the man is not only essential, but necessarily a man who earns a good salary; and unless he gets it your company loses. Sell your service and your company to your patrons, and do so by a well-paid, well-trained, well-managed sales organization.

GAS WATER HEATING POSSIBILITIES

(Continued from page 1141)

large storage tank or a very large heater, and perhaps both, to provide enough hot water so that the last user will have just as hot water as the first. The space available may not permit of a heater of the necessary size when coal is used, especially where provisions also must be made for the storage of the fuel needed. A gas water heater solves this problem for the water user, the heater of the required capacity requiring very little space and the rate of heating the water being such that no larger tank is needed than has been used in order to give a perfectly satisfactory hot water service.

Workers Demand Hot Water in Lavatories

Along the line of water heating, it is well to bear in mind the influence that the demand of labor is having on hot water uses. It is not so many years ago when we used to see men coming from the shops in old clothes and with dirty faces and hands. The shops and the factories in those days did not find it necessary to supply wash rooms and locker rooms which permitted the men to clean up and change their clothes and leave the factory all spick and span. Today, however, in the evening it is not always easy to separate the men riding on the street cars and in the automobiles who have come from business offices from those who have come from a day's work at a machine.

Along with higher wages and shorter hours, the working man has been able to get better wash room and locker room facilities at the shop in which he works. He may be working in an establishment where there is not only ample hot water in the wash room, but also shower baths. We find shower baths in more and more industrial establishments today. Still more of them will be installed, because with the present labor demand no employer can afford for any great length of time to neglect providing working conditions that will make his establishment an attractive one in which to work.

As a matter of fact, if this proposition was given the attention it really deserves, there is reason to believe that more manufacturers would add more facilities to their wash rooms than they have there at the present time. Many of them do not realize the possibilities of gas water heating. They do not realize how cheaply the water may be heated by gas.

Current Market Prices

COALS (By Courtesy of Coal Age)
A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.50 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.35 to 2.75
Kanawha mine run	Columbus,	1.35 to 1.65
West Virginia lump	Cincinnati	2.75 to 3.25
W. Virginia gas mine run	Cincinnati	1.50 to 1.65
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.55
South and Southwest		
Big Seam lump	Birmingham	2.75 to 3.50
Big Seam mine run	Birmingham	1.50 to 1.75
Southeast Kentucky lump	Louisville	3.00 to 3.50
Southeast Kentucky mine run	Louisville	1.50 to 1.75

B. Anthracite.
(Spot prices F. O. B. mines, gross tons),

	Market	Freight rates	Independent	Company
Egg	New York	$2.34	$9.25 to $9.75	$8.75 to $9.25
Egg	Philadelphia	3.39	9.25 to 9.75	8.80 to 9.25
Egg	Chicago (net tons)	5.06	8.17 to 8.27	8.14 to 8.20

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.00 to $3.25
Wise County, furnace	3.75 to 4.00
Alabama, furnace	4.50 to 4.75
Foundry, Newark, N. J., del	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	11.00
Foundry, Granite City, Ill	9.00
Foundry, Alabama	5.00 to 5.25

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)
(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.50
Lima	1.58
Pennsylvania	$2.75 to 2.85
Wooster, Ohio	1.40
Indiana—Illinois.	
Illinois	1.37
Indiana	1.38
Oklahoma—Kansas.	
Healdton	.90
Mid-continent (low gravity)	.75
Gulf Coast.	
Gulf Coast, Grade A	$1.25
Gulf Coast, Grade B	1.05

GAS OILS.

Gas Oil, Bayonne, bulk gal	5 to 5¼c
Gas Oil (32-36) Oklahoma, gal.	2¾ to 3 c
Gas Oil (32-36) Gulf Coast, gal	3¾ to 4 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.
(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$59.20
Six-inch and over, Chicago	55.20
Four-inch, Birmingham	$53.00 to 54.00
Six-inch and over, Birmingham	49.00 to 50.00
Four-inch, New York	69.60 to 71.60
Six-inch and over, New York	64.60 to 65.60
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20

BY-PRODUCTS
(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb	5 to 5¼c
Ammonia aqua, 20 deg. drums lb	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb	30 to 36 c
Ammonium sulphate, bulk F. O. B. Works, per 100 lbs	$2.65 to $2.70
Potash prussiate, yellow casks, lb	17 to 18 c
Potash prussiate, red casks, lb	37 to 38 c
Soda prussiate, yellow casks,	9¼ to 9¾c
Soda sulphocyanide, barrels, lb	45 to 55 c

COAL TAR BASIC PRODUCTS.
(By Courtesy of Oil, Paint and Drug Reporter)

Benzol C. P. tanks, works, gal.	24 to 25c
Benzol, drums, gal	30c
Benzol, 90% tanks, works, gal.	23c
Benzol, 90% drums, gal	28c
Napthalene, flake, barrels, lb	4½ to 5 c
Napthalene, dyestuff bags, lb	4½ to 5 c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal	29 to 30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal	36c

Coal

An unprecedented stretch of unseasonably warm weather has taken the edge off the demand for coal in many sections of the country, with the result that the market has been hard put to hold its own.

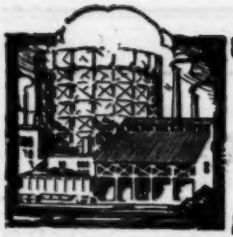
After ten weeks of steady increase, bituminous coal output reacted during the week ended October 18, when, according to the Geological Survey, 10,255,000 net tons was produced. This was a decline of 298,000 tons from the week ended October 11, when the output was 10,553,000 tons, according to revised figures. The falling off was due partly to the observance of Columbus Day. Anthracite production, on the other hand, registered a slight gain during the week ended October 18, 1,750,000 net tons having been produced, an increase of 13,000 tons over the previous week.

Crude Oil

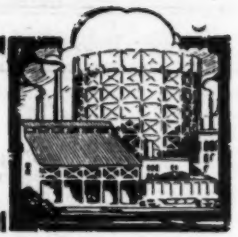
Another drop in crude oil production occurred during the week ended October 18, when the output fell off 12,650 barrels daily. According to the American Petroleum Institute, daily average gross production for the week was 1,971,350 barrels, as compared with 1,984,000 barrels for the preceding week, a decrease of 12,650 barrels.

Gas Oil

Gas oil business was also holding up, the market being steady on the basis of 5c. to 5¼c. per gallon, bulk, f. o. b. Bayonne, as to gravity.



NEWS OF THE GAS INDUSTRY



Gas Used at Convention—Results of Contest

The gas furnished to the Steel Pier during the A. G. A. convention was measured with a Thomas meter, which was a part of the exhibit of the Cutler-Hammer Mfg. Company.

The meter housing was connected into the 6-inch pipe line and was located in the center aisle at the entrance to the Pier.

The results were given in Booths No. 74 and 75, about 450 feet away.

The meter was read by Major Forward, secretary-manager of the American Gas Association, at 12:15 noon, Monday; the dial was then blindfolded, but the graphic chart—showing the rate of flow in cubic feet per hour at 36-60 sat.—was left open to view, and the convention delegates were invited to estimate the amount of gas consumed during the week.

Five prizes were offered by the Cutler-Hammer Mfg. Co. for the first five estimates nearest to the correct amount.

First prize—Box of Corona Coronas.

Second prize—Box of Corona Perfectos.

Third prize—Box of Corona Belvederes.

Fourth prize—Box of Corona Belvederes.

Fifth prize—Box of Corona Belvederes.

At 12:10 Friday noon the gas was shut off the Steel Pier. The meter was then read by N. T. Sellman, assistant secretary-manager American Gas Association, L. O. Greiner, shop superintendent, Atlantic City Gas Company, and W. H. Jefferson, the Cutler-Hammer Mfg. Co.

Meter statement and gas consumed:

Oct. 13, 12:15 p. m., meter reading	00004500
Oct. 17, 12:10 p. m., meter reading	00146320
Total cu. ft. (30-60 Sat.)	141820

About 400 estimates were submitted, the five nearest to the correct amount being:

	Estimated Amount cu. ft. (30-60 Sat.)	Difference from Correct Amount
1. C. E. Ewen, Eng., United Lt. & Power Co., Moline, Ill.	142,122	+302 cu. ft.
2. H. R. Cook, Jr., Gen. Supt., Cons. Gas, Elec. Lt. & Power Co., of Baltimore	141,450	—370 cu. ft.
3 F. E. Hamilton, Chief Eng., Rainey - Wood Coke Co., N. Y. City	141,397	—423 cu. ft.
4. John H. Wolfe, Supt. Spring Gardens Station Consol. Gas, Elec. Lt. & Power Co., of Balt.	141,345	—475 cu. ft.
5. C. K. Wirth, Steere Eng. Co., Detroit.	141,275	—545 cu. ft.

Incidentally, the value of the graphic chart, reading direct in cubic feet (36-60 Sat.) was very clearly demonstrated, as there were many estimates between 135,000 and 145,000 cubic feet.

Henry D. Schall Joins Baltimore Gas Appliance & Mfg. Co.

The board of directors of the Baltimore Gas Appliance & Mfg. Co. have pleasure in announcing the election of Henry D. Schall as vice president in charge of sales.

Gas Companies Combine

Albany, N. Y.—The Public Service Commission today approved the purchase by the Continental Light and Power Company of Wilmington, Delaware, of the common capital stock of the Saugerties Gas Light Company. The Continental Company was organized for the purpose of acquiring gas and electric properties as a holding company and not as an operating company. No opposition to the sale of the stock appeared at the hearing on the matter.

Pres. Johnson Has a Few Words to Say About the Indiana Gas Association

The Indiana Gas Association covers only the State of Indiana and is affiliated with the American Gas Association. The last annual meeting was held at West Baden Springs, Indiana, on May 7-8, 1923. The officers in control of the association are as follows:

G. M. Johnson, president, South Bend; E. J. Burke, secretary-treasurer, Indianapolis; H. J. Roach, vice-president, Crawfordsville.

Directors, E. L. Donovan, Logansport; F. W. Sargeant, Indianapolis; I. C. Shepard, Evansville; E. E. Clay, Columbus; T. J. Sprague, Indianapolis; E. Van Arsdel, Indianapolis; C. L. Kirk, Indianapolis; Harry Flint, Connersville; J. G. Martin, Greencastle.

Past president, directors ex-officio—S. E. Mulholland, Fort Wayne; J. H. Maxon, Muncie; James W. Dunbar, New Albany; C. D. Shaul, Terre Haute; W. W. Goodrich, Winchester; Morse Dellplain, Hammond; F. B. Tracy, Muncie; Leonard Fitzgerald, Gary.

Prior to the spring of 1919 all meetings of the association were held in the city of Indianapolis, which is the capital of the state, and since that time the last five meetings have been held at the West Baden Springs Hotel. The annual meeting dates of the association are arranged so as not to conflict with any other conventions in the country, as the association is always glad to have the presence of all the representatives of the different manufacturers

who carry membership in the association.

West Baden Springs is located only about a mile and a half from the celebrated French Lick Springs Hotel and they are both equipped to rent approximately 1,600 rooms combined and have become very renowned as winter resorts. Conventions held in both these places are always arranged late in the spring or early in the fall, at a time when the general business of the hotels is rather quiet, thereby insuring everyone proper accommodations.

On account of this affiliation with the American Gas Association, the Indiana Gas Association has been represented on the managing committee of the different sections.

The Atlanta Gas Rate Case

Attacking the report of Cam D. Dorsey, master of chancery in the Atlanta Gas Rate case, the Georgia Railway and Power Company has filed a bill of exceptions in the United States District Court which alleges that the present gas rate is confiscatory, while an answer, also filed today by the Georgia Public Service Commission attacks the Dorsey report from the opposite side, setting forth that the valuation of $8,015,000 which he placed on the gas company's property is too high.

Each petition asked the court to sustain the objections and so modify the master's report.

The power company renewed its plea that the court enjoin the commission from enforcing the present gas rate. The Public Service Commission, however, insists that the master in chancery should have based his valuation of the property upon prices as they existed December 30, 1921, instead of on prices of January 1, 1924, retaining the present rate.

Placing Underground Pipes

Denver, Colo.—The question has arisen in Denver, Colorado, as to the placing of gas and water pipes to feed vacant lots, so that when the streets are put down in permanent shape there will be no need to tear up the street to get a connection with the main feeders.

This is all right if a new street is being laid and certain lots on the street are soon to be built on, in fact, good engineering would demand it, but some of the improvement council advocate that every lot along the street should be connected.

To this suggestion there has been opposition shown by the Denver Water Company, a municipal owned concern, and the Public Service Company of Colorado, the gas and electric servitors.

It may be that some of these lots will be vacant for years, then who is going to "hold the bag" for the money invested in the useless stubs of pipe, many of them more than fifty feet long?

It is pretty hard to make some people understand what "turnover" means to a business man, the unschooled nursing theories which would die a sudden death if practice asserts itself.

The city fathers have taken the matter under advisement and it is within reason to suppose that the untenable theory will lie "under," for that is how such whims should be treated.

Waterless Gas Holder to Be Built

Somerville, N. J.—To meet the constantly increasing demands for gas in Somerville and vicinity, the Public Service Electric and Gas Company will shortly start building a 500,000 cubic foot waterless type of gas holder. This holder will be one of the few in the country of the new type and the first to be built by Public Service. Plans are under way for the construction of a 15,000,000 cubic foot holder of this design in Harrison.

The Somerville holder will be approximately 125 feet in height and 81 feet 7 inches in diameter. It will take about four months to construct. In the gas industry the proposed holder is known as the "waterless" holder, in that a tar-coated fabric will be used as a seal instead of water, as has been universally employed heretofore. This type of container was first developed in Germany, and, although a large number of them have been erected in Germany, France and Holland, they but recently have been introduced in this country, where three or four are now in the course of construction. It is said that the United States Steel Corporation is negotiating for the building of a holder of this type with a capacity of 50,000,000 cubic feet at Gary, Indiana.

The holder will consist of a single rigid frame instead of a series of huge cylinders or lifts which telescope, one within the other, the upper lifts rising and lowering as the quantity of gas in the container varies. In the usual holders there are "water seals" for each of these lifts to prevent gas escaping. The large volume of water required for "sealing" purposes adds great weight to the structure, making necessary heavier steel construction to support it. Use of water also requires the maintenance of a steam heating plant to prevent freezing in cold weather. With the water omitted in the new holder much lighter steel plates can be used and no steam heat is required, as the sealing fluid is recirculated by electrically operated automatic pumps located outside the base of the holder.

Inside, the holder will be equipped with a close fitting piston of fabricated steel which will ascend and descend as gas is introduced into or withdrawn from the container. The position of this moving piston will not be discernible from the outside of the structure, but a registering device will show at all times how much gas the holder contains.

An unusual engineering feature enters into the construction of the new type holders. After the foundations are laid and the steel bottom is in position, the piston, whose dimensions are approximately the interior measurement of the container, is put together and is then used as a working platform in lieu of scaffolding, for the rivetting of the steel wall plates, the piston being forced upward by means of compressed air as the work on the side walls progresses.

Michigan to Pass on Gas Service

Lansing, Mich.—A conference of municipal and gas utility representatives will be held with the State Public Utilities Commission.

probably in November, to discuss a wide range of gas service problems and map out a definite slate of rules. The conference was originally scheduled for yesterday, but was adjourned to give the cities time to appear.

Although the commission can enforce whatever rules may be adopted, only in about twenty cities in which it has jurisdiction—that is, in localities where franchises have expired or joint petitions have been fixed, placing the rate fixing power with the commission—it is expected that Detroit and many other cities outside the commission's jurisdiction will be guided to a large extent by the findings of the conference.

One of the things to be considered is the British Thermal Unit requirement for gas. The commission now has a standard of at least 530 B.t.u. In many cities it was 600 until the war, when Federal recommendations cut the thermal content. Regular meter inspection, pipe sizes, purity, non-sulphurous coal and uniformity of deposits, service charges, meter readings and payments will be considered.

According to the commission engineers, the use of ¾-inch instead of the recommended 1¼-inch decreases the pressure in the pipe to such an extent that when a user is consuming a fairly large amount the volume of low pressure gas passing through the meter registers a greater charge than he should be required to pay.

Among the cities it is expected will be represented are Grand Rapids, Flint, Battle Creek, Ann Arbor, Jackson and Lansing. Some cities owning their own plants, which put them outside the commission's jurisdiction, have indicated they will abide by the rules set in the conference.

LINCOLN UTILITY MERGER

Two Competing Companies in Nebraska Capital Are Joined

New York, N. Y.—A merger of the competing light plants of the Lincoln Gas and Electric Company of Lincoln, Neb., a Continental Gas and Electric subsidiary, and the Lincoln Traction Company, which operates also the street railway system of Lincoln, has been approved by the Nebraska State Railway Commission.

The Continental has purchased stock control of the traction company and takes over all its property, including a steam heating system in the business section of the city.

The Lincoln merger is believed to be in connection with recently announced consolidation of five large mid-West utility companies, with their subsidiaries, known as the Continental-United Light and Power merger.

Took a Prominent Part in Pacific Coast Association

Among the delegates who contributed materially to the success of the recent Santa Barbara convention of the Pacific Coast Gas Association were Mr. and Mrs. Norman R. McKee. Mr. McKee

was chairman of the arrangements committee and had charge of most of the activities at the convention. Mrs. McKee, as a member of the ladies' reception committee, did well in the entertainment of the forty lady delegates.

Mr. and Mrs. McKee arrived in Santa Barbara several days ahead of the delegates, in order to get all details cleared for the convention, and the records show that they were among the last to leave.

Photo shows Mr. and Mrs. McKee on the porch of the Arlington Hotel, the official headquarters of the convention.

Contracts Awarded

The Republic Light, Heat & Power Company of Tonawanda, N. Y., has awarded contract to the Gas Machinery Company of Cleveland, Ohio, for a new nine-foot carburetted water gas apparatus.

The new water gas set will be located in the old water gas building, and the contract includes overhead brick operating floor, motor-driven blower, generator charging equipment, new grasshopper connection for holder, as well as yard piping, valves and fittings.

The gas company is also installing new boiler, exhauster and other auxiliary equipment, which will make the water gas plant complete.

Gas Company Extends Operations

The Public Service Commission held a hearing recently on the application of the Adirondack Power & Light Corporation for permission to extend its electric lines in the town of Fort Edward, Washington county, and to lay gas mains in the town of Colonie, Albany county. The company plans to erect a high transmission line to supply the plant of the Iroquois Paper Company. The line passes through the town of Fort Edward and the company proposes to give service to consumers in the territory served by the lines. There was no opposition.

No opposition was offered to the proposal to lay a gas main. The company has entered into a contract with the Troy Coke & Iron Corporation for the purchase of gas at Troy. In order to transmit the gas from Troy it is necessary to lay a main through the city of Watervliet and the towns of Colonie and Rotterdam. A franchise was granted by the town of Colonie August 4 and it was for approval of this franchise that the application was made. W. A. McClintock of Schenectady represented the Adirondack company in the matter of the extension of the electric lines and Daniel F. Imrie of Glens Falls in the gas main application.